Amendments to the Claims:

This listing of claims reflects all claim amendments and replaces all prior versions, and listings, of claims in the application (material to be inserted is in **bold and underline**, and material to be deleted is in ~~strikeout~~ or (if the deletion is of five or fewer consecutive characters or would be difficult to see) in double brackets [[ ]].

Claims 1-7, 18, 20 and 31-33 have been cancelled; claims 8-17, 19 and 21-30 have been withdrawn; and claims 34-47 are new.

Listing of Claims:

1. (cancelled)

2. (cancelled)

3. (cancelled)

4. (cancelled)

5. (cancelled)

6. (cancelled)

7. (cancelled)

8. (withdrawn) A method of forming a library of determinable chemical compounds, comprising the steps of

(a) placing into each of a plurality of a separate reaction vessels, carriers having a selected one of a plurality of optically detectable code combinations, each defined by one of N>1 spatial code positions and one of M>2 optically detectable indicia at each spatial code position, such that the carriers in any vessel all have one of up to M^N different code combinations,

(b) reacting the carries in each vessel with reagents effective to form on the carriers, as solid-supports, a selected one of up to M^N different known library compounds, and

(c) forming a mixture of carriers from different reaction vessels.

9. (withdrawn) The method of claim 8, wherein said reacting includes the steps in a stepwise oligomer synthesis reaction effective to form oligomers with known or random sequences on the solid-support carriers.

10. (withdrawn) A method of detecting one or more target molecules capable of binding specifically to one or more different, known library compounds, comprising

(a) contacting the target molecule(s) with a chemical-library composition composed of

(i) a plurality of coded carriers, each having N>1 spatial code positions and one of M>2 optically detectable indicia at each code position, such that each carrier can be identified by one of up to M^N different code combinations, and

(ii) a different known library compound carried on each different-combination carrier, under conditions in which the target molecules can bind specifically to known library compounds,

(b) distributing the carriers for individual-carrier decoding, and

(c) detecting carriers having bound target molecule(s) and

(d) decoding the carriers having bound target molecules, to identify the library compound(s) to which the target molecule(s) are bound.

11. (withdrawn) The method of claim 10, wherein said distributing includes placing the carriers at discrete locations on a substrate surface, and said detecting and decoding is carried out by an optical detector operable to optically scan the substrate surface.

12. (withdrawn) The method of claim 10, wherein said distributing includes flowing said cylinders through a capillary tube, past a detector.

13. (withdrawn) The method of claim 10, wherein said distributing includes aligning said carriers in a capillary tube, and moving said tube relative to an optical detector.

14. (withdrawn) A method of multiplexing the detection and quantification of analytes comprising the steps of:

(a) distributing on a surface a plurality of said coded carriers of claim 1, said carriers each different carrier having a different compound attached thereto,

(b) scanning the surface for carriers having a detectable reporter,

(c) recording the positions of the carriers having a detectable reporter,

(d) determining the code for each carrier at each recorded position.

15. (withdrawn) An array device comprising,

(a) a surface, and

(b) a plurality of spatially coded carriers having different compounds attached to different carriers, wherein the carriers have N>1 spatial code positions and M>2 optically coding indicia at each spatial coding position, each of said optical coding indicia being a different color, said carriers are randomly distributed upon the surface.

16. (withdrawn) A kit comprising

a plurality of separated classes of compoundless coded carriers,

wherein each class contains a plurality of compoundless coded carriers,

(a) each carrier within that class having the same spatial code, said spatial code having N>1 spatial coding positions and M>2 optical indicia at each coding position, each optical indicia being a different color, and each different class having compoundless coded carriers having a different code, and

(b) each compoundless coded carrier is capable of having a compound attached thereto.

17. (withdrawn) A method for making the composition of claim 1, comprising the steps of forming thin transverse section of an assembly comprising N>1 filament regions of M>2 different colors by bundling together said filaments to form a fused bundle, and sectioning said fused bundle to produce carriers having one of said M>2 color indicia at each of said N>1 spatial code positions, and attaching to each of said carriers a different known chemical compound.

18. (cancelled)

19. (withdrawn) A method of detecting two or more target molecules in an analyte capable of binding specifically to two or more known different compounds on different carriers from a carrier library contained in an sample, comprising the steps of

(a) partitioning the carrier library into a plurality of sublibraries and splitting the analyte into a plurality of subanalytes,

(b) contacting each subanalyte with a sublibrary in a condition in where at least one target molecule can bind specifically to at least one corresponding sublibrary carrier and where conditions are independent for each sublibraries,

(c) pooling together carriers from all sublibraries,

(d) distributing the carriers on a surface,

(e) detecting carriers having bound target molecule(s) and

(f) decoding the carriers having bound target molecules, to identify each compound that bound target molecules are bound.

20. (cancelled)

21. (withdrawn) A coded particle for use in carrying out selected chemical or biological reactions or analyses, comprising

(e) a plurality of self-orienting coded carriers, each having N>1 spatial code compartments and one of M>2 optically detectable indicia at each code compartment, so that each carrier can be optically identified by one of up to M^N different code combinations, each of said M>2 indicia being a different color, and

(f) a different known chemical compound carried on each different-combination carrier,

wherein each of said carriers is formed of N separate layers or bundled fibers, each layer or bundled fiber having one of M different color indicia, said layers or bundled fibers form said spatial code compartments, and said carrier are formed in a shape adapted to self orient into a carrier holder within an holder array to expose said spatial code to a optical window within said holder, said window in optical communication with a detector for reading said spatial code.

22. (withdrawn) The coded particle of claim 21 wherein the carrier has a cross sectional shape selected from the group consisting of; circles, triangles, squares, hexagons, octagons, decagons, polygons.

23. (withdrawn) The coded particles of claim 21 wherein at least one carrier is embedded in a larger spherical structure, wherein said code is readable from and external surface of said spherical structure, said structure is adapted to hold compounds, cells, or biological materials.

24. (withdrawn) The coded particles of claim 21 wherein said carrier is self orientating by virtue of a portion of said carrier being susceptible to attraction or repulsion by a force selected from the group consisting of gravity, electrostatic forces, electrophoretic forces, dielectric forces, and magnetism.

25. (withdrawn) An apparatus for detecting activity on the coded carrier of claim 21, and determining said code, comprising,

a carrier holder array, said carrier having a plurality of holders distributed therein, said holders adapted to hold said carriers so that said coded carriers code faces an optical window in optical communication with a detector, said window situated within said holder to optically detect at least one surface of said carrier, said at least one surface displaying said spatial code,

wherein when said carrier is held in said holder after said carrier is positioned within said holder, said detector is able to detect at least one activity on said carrier, and said detector is able to detect said spatial code of said carrier.

26. (withdrawn) The apparatus of claim 25, wherein said carrier is self-orienting, and said holder is adapted to self-orient said carrier so that at least one spatial code is detectable by said detector.

27. (withdrawn) A composition for multiplexed analysis of one or more different known cell populations comprising:

a plurality of coded carriers, each formed of N>1 ordered spatially distinct compartments, and each compartment having one of M>1 detectable indicia, such that each carrier can be identified by one of up to M^N different code combinations, and

a different known cell population attached to each different carrier.

28. (withdrawn) A composition for multiplexed analysis of one or more different known cell populations comprising:

a plurality of coded carriers, each formed of N>1 ordered spatially distinct compartments, and each compartment having one of M>2 detectable indicia, such that each carrier can be identified by one of up to M^N different code combinations, and

a different known cell population attached to each different carrier.

29. (withdrawn) A microparticle for carrying and identifying one or more compounds or biological entities attached thereto, comprising:

a coded carrier

said coded carrier having a spatial optical code formed therein, said code having N>1 spatially distinct compartments, and each compartment having one of M>2 spectrally distinct detectable indicia, such that each carrier can be identified by one of up to M^N different code combinations, and

one or more known compounds or biological entities attached to said carrier,

said compounds or biological entities having at least one identifying feature,

wherein said code correlates to said identifying feature of said compounds or biological entities, to identify such compounds or biological entities.

30. (withdrawn) An apparatus for analyzing events occurring on or adjacent a microparticle containing an identifying code having at least one code viewing surface, comprising:

one or more fiber optic receivers,

said receivers having an outer cladding and an inner core, said outer cladding protruding at one end from said inner core to form at lest one wall of a receiver area for receiving and orienting said microparticle so that at least one code viewing surface of said identifying code faces said end of said fiber optic receiver,

a detector

said detector for detecting said events occurring on or adjacent said coded microparticle, said detector being in optical communication with said inner core,

a reader,

said reader for reading said code from at least one code viewing surface, said reader being in optical communication with said inner core,

wherein said receiver area holds said particle so that said code's viewing surface is readable by said reader, and said events are detectable by said detector while said microparticle resides within said receiver area.

31. (cancelled)

32. (cancelled)

33. (cancelled)

34. (new) A method for conducting a multiplexed experiment comprising

providing a first class of particles in a first vessel, each particle in the first class having a first optically detectable code, and a second class of particles in a second vessel, each particle in the second class having a second optically detectable code,

attaching a first type of analyte to particles in the first vessel, and attaching a second type of analyte to particles in the second vessel,

forming a mixture of particles from the first and second vessels, the mixture having substantially equal numbers of particles from each vessel,

dispersing a portion of the mixture to an examination site on a surface, the particles of the first and second classes being distributed to random positions across the examination site,

reacting the portion of the mixture with a test substance,

acquiring at least one image of particles at the examination site on the surface, and

using code information from the at least one image to interpret results of the experiment.

35. (new) The method of claim 34, wherein each of the particles has at least one flat viewing surface and a shape that self-orients the viewing surface to face a viewing direction substantially perpendicular to the surface.

36. (new) The method of claim 34, wherein each particle has at least one transparent portion.

37. (new) The method of claim 34, wherein each carrier comprises a combination of fused fibers of various colors, the colors and relative positions of the fibers indicating the code.

38. (new) The method of claim 34, wherein the coupling step includes attaching biological cells to particles in each vessel, the code on each particle identifying a characteristic of a cell coupled to the particle.

39. (new) The method of claim 34, wherein analytes are coupled to particles covalently.

40. (new) The method of claim 34, wherein the reacting step is performed before the dispersing step.

41. (new) A method for conducting a multiplexed experiment comprising

providing a first class of particles in a first vessel, each particle in the first class having a first optically detectable code, and a second class of particles in a second vessel, each particle in the second class having a second optically detectable code,

coupling a first type of analyte to particles in the first vessel, and attaching a second type of analyte to particles in the second vessel,

forming a mixture of particles from the first and second vessels, the mixture having substantially equal numbers of particles from each vessel,

dispersing a portion of the mixture to an examination site on a surface, the particles of the first and second classes being distributed to random positions across the examination site,

directing an imaging device toward the examination site, the imaging device being configured to acquire images of particles at the examination site,

acquiring a set of images of particles at the examination site, each image corresponding to a different spectral band, and

operating a computer program to identify particles of the same class by using the images to develop a mask for the particles of the same class, and detecting one or more reporting modalities within the mask.

42. (new) The method of claim 41, wherein each of the particles has at least one flat viewing surface and a shape that self-orients the viewing surface to face a viewing direction substantially perpendicular to the surface.

43. (new) The method of claim 41, wherein each particle has at least one transparent portion.

44. (new) The method of claim 41, wherein each carrier comprises a combination of fused fibers of various colors, the colors and relative positions of the fibers indicating the code.

45. (new) The method of claim 41, wherein the coupling step includes attaching biological cells to particles in each vessel, the code on each particle identifying a characteristic of a cell coupled to the particle.

46. (new) The method of claim 41, wherein analytes are coupled to particles covalently.

47. (new) The method of claim 41, wherein the reacting step is performed before the dispersing step.